

target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-06-08T03:44:46.620
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4116785290664312064
 2Mass ID (if available) : 17362831-2250596

Jupiter 2031-06-08T03:44:46 K7.42 G14.59 Pgt

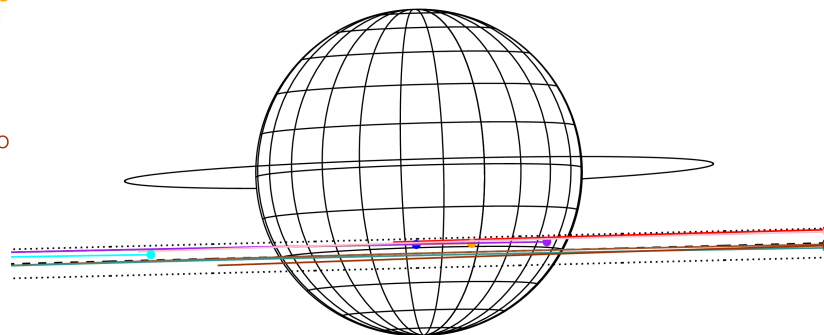
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71131s

RUWE (>1.4 is poor) : 0.89
 K magnitude : 7.417
 G magnitude : 14.588
 RP magnitude : 12.964
 BP magnitude : 18.251
 DUPflag : 0
 Distance (au) : 4.276
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -16.17
 Sun-Target sep (deg) : 172.17
 Sun-Moon sep (deg) : 29.88
 B (ring opening deg) : -2.60
 PA of pole (deg) : 1.70
 Pole direction: RA (deg): 268.05692
 Dec (deg): 64.49651
 C/A sky separation (") : 11.423
 C/A sky separation (km) : 35424.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-06-08T03:44:46 K7.42 G14.59
 Pgt



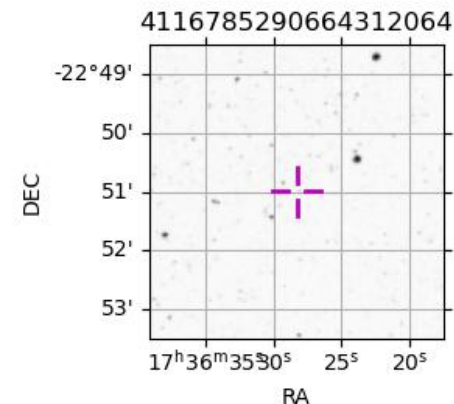
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO
 SAAO



2031-06-08T03:44:46.6200 α: 17 36 28.3015 δ: -22 50 59.711 C/A ***** PA 1.47 deg v_sky -16.17 km/s D 04.28 AU
 Credit: Styled after SORA/Lucky Star

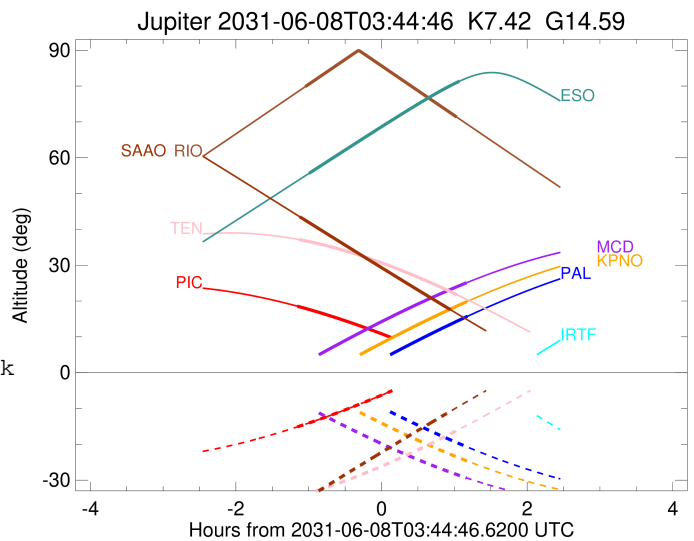
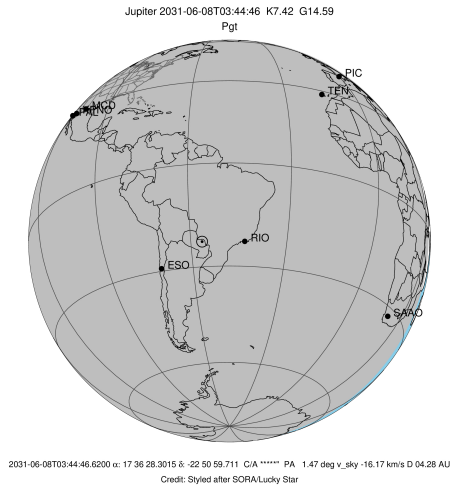
Observable events with sun below -5 deg and altitude above 5 deg

| Obs | Location | lat | Elon | Target | Observed Events Interval | OCode |
|------|-----------------------------------|-------|-------|--------|-----------------------------|-------|
| PIC | Pic du Midi | 42.9 | 0.1 | + | JUN 08 02:35 - JUN 08 02:35 | Pin |
| PAL | Palomar Mt (200") | 33.4 | 243.1 | + | JUN 08 04:55 - JUN 08 04:55 | Pne |
| PMO | Purple Mtn Obs. Nanking | 32.1 | 118.8 | | | Pnn |
| KPNO | Kitt Peak Natl Obs | 32.0 | 248.4 | + | JUN 08 04:55 - JUN 08 04:55 | Pne |
| MCD | McDonald Obs. 2.7m | 30.7 | 256.0 | + | JUN 08 04:54 - JUN 08 04:54 | Pne |
| TEN | Teide Obs./Tenerife | 28.3 | 343.5 | + | JUN 08 02:36 - JUN 08 04:47 | Pie |
| IRTF | Mauna Kea/IRTF | 19.8 | 204.5 | | | Pnn |
| KAV | Kavalur Observatory | 12.6 | 78.8 | | | Pnn |
| RIO | Rio de Janeiro | -22.9 | 316.8 | + | JUN 08 02:41 - JUN 08 04:46 | Pie |
| ESO | European Southern Obs. (3.6m) | -29.3 | 289.3 | + | JUN 08 02:44 - JUN 08 04:49 | Pie |
| AAT | Siding Spring (AAT) | -31.3 | 149.1 | | | Pnn |
| SAAO | So. Afr. Astro. Obs. (Sutherland) | -32.4 | 20.8 | + | JUN 08 02:37 - JUN 08 04:41 | Pie |
| MSO | Mt. Stromlo Observatory | -35.3 | 149.0 | | | Pnn |



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:41:11.140
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : PIC
Location             : Pic du Midi
Latitude (deg)       : 42.93656
E. Longitude (deg)   : 0.14231
Altitude (km)        : 2.890
Gaia source ID       : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71131s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 7.417
G magnitude          : 14.588
RP magnitude         : 12.964
BP magnitude         : 18.251
DUPflag             : 0
Distance (au)        : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)   : 29.43
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 9.716
C/A sky separation (km): 30129.7
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

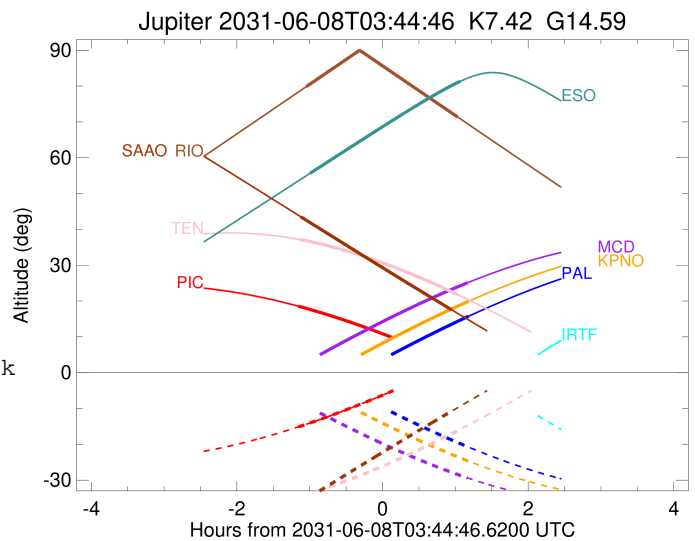
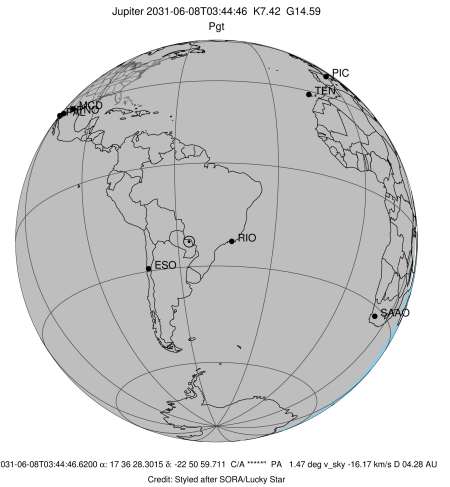


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:35:27.870 | 18.55 | -15.13 | 71490.4 | -24.86 | -27.88 |
| Jupiter | E | 2031-06-08T04:47:10.959 | 2.05x | 3.22x | 71490.3 | -25.04 | -28.07 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T03:50:14.060
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : PAL
Location              : Palomar Mt (200")
Latitude (deg)        : 33.35622
E. Longitude (deg)    : 243.13601
Altitude (km)         : 1.706
Gaia source ID        : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71132s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 7.417
G magnitude           : 14.588
RP magnitude          : 12.964
BP magnitude          : 18.251
DUPflag              : 0
Distance (au)         : 4.276
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)   : 30.54
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 10.168
C/A sky separation (km) : 31531.2
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

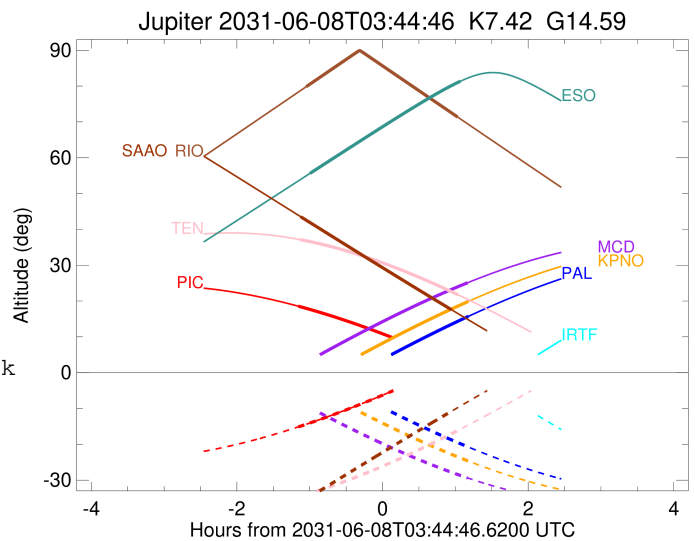
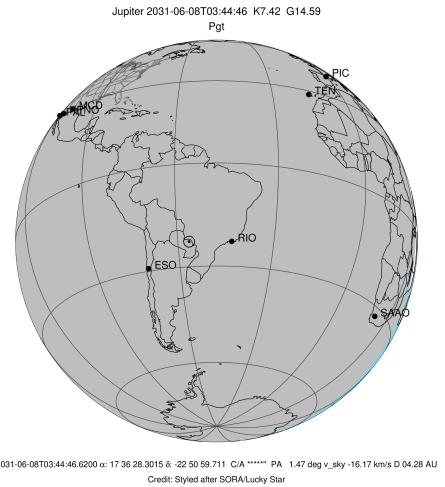


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:44:28.918 | -7.62x | 1.08x | 71490.1 | -26.89 | -30.06 |
| Jupiter | E | 2031-06-08T04:55:33.234 | 15.72 | -20.76 | 71490.3 | -25.45 | -28.51 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:50:05.570
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71132s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 7.417
G magnitude           : 14.588
RP magnitude          : 12.964
BP magnitude          : 18.251
DUPflag              : 0
Distance (au)         : 4.276
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)   : 30.56
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.145
C/A sky separation (km) : 31461.5
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

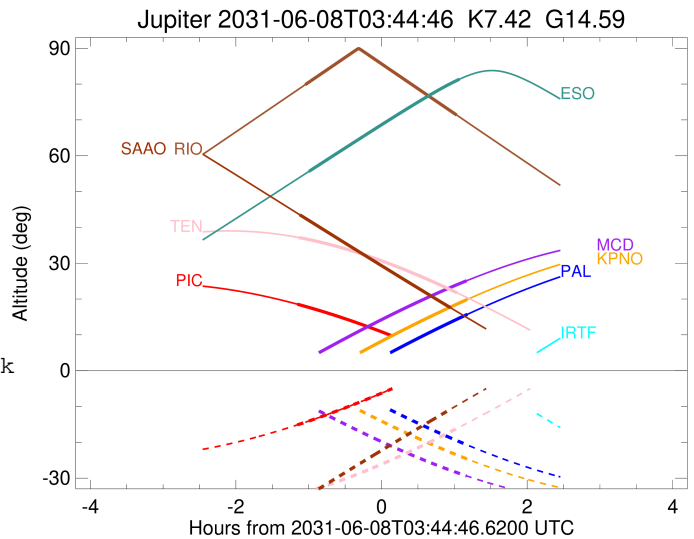
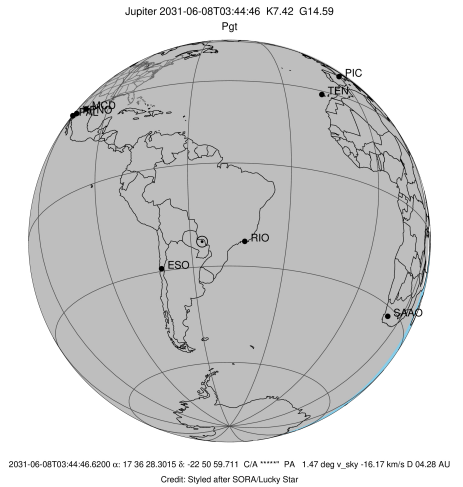


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|--------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:44:27.268 | -3.00x | -3.48x | 71490.1 | -26.83 | -29.99 |
| Jupiter | E | 2031-06-08T04:55:18.694 | 19.86 | -24.65 | 71490.3 | -25.40 | -28.46 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:49:45.660
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71132s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 7.417
G magnitude          : 14.588
RP magnitude         : 12.964
BP magnitude         : 18.251
DUPflag             : 0
Distance (au)       : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)  : 30.57
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 10.098
C/A sky separation (km) : 31315.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

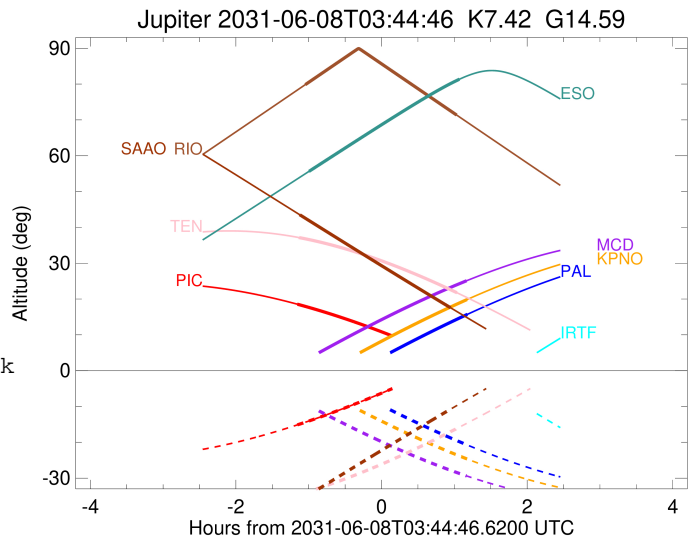
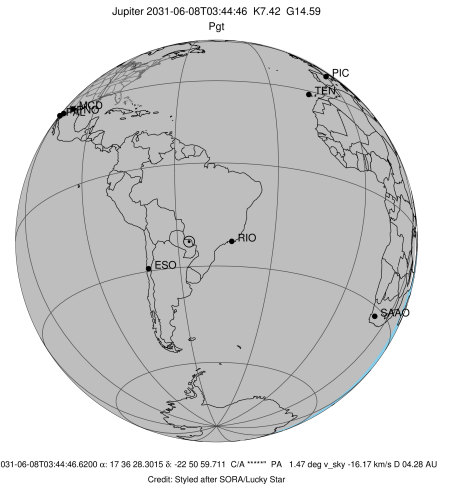


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:44:15.343 | 3.32x | -9.64 | 71490.1 | -26.68 | -29.83 |
| Jupiter | E | 2031-06-08T04:54:52.495 | 25.10 | -29.38 | 71490.3 | -25.31 | -28.36 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-06-08T03:41:47.120
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : TEN
Location              : Teide Obs./Tenerife
Latitude (deg)        : 28.30050
E. Longitude (deg)    : 343.48909
Altitude (km)         : 2.395
Gaia source ID        : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71131s
RUWE (>1.4 is poor) : 0.89
K magnitude           : 7.417
G magnitude           : 14.588
RP magnitude          : 12.964
BP magnitude          : 18.251
DUPflag              : 0
Distance (au)         : 4.276
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg)  : 172.17
Sun-Moon sep (deg)   : 29.67
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 9.904
C/A sky separation (km) : 30713.4
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

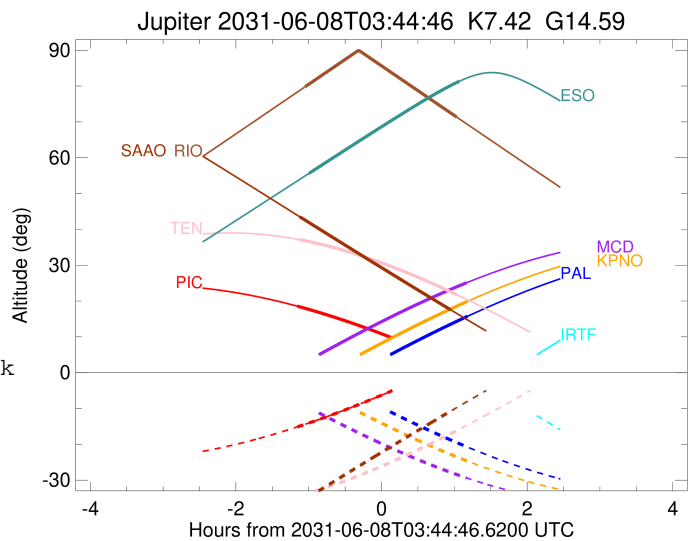
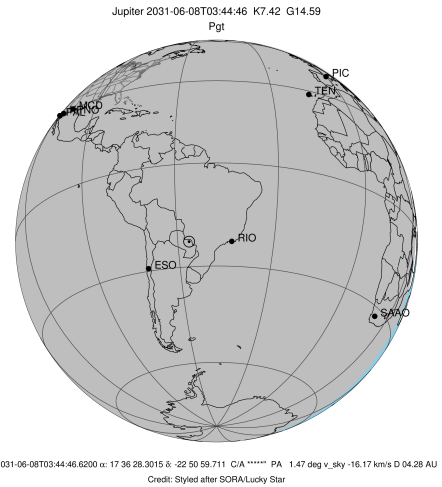


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:36:47.914 | 37.15 | -34.45 | 71490.3 | -25.46 | -28.53 |
| Jupiter | E | 2031-06-08T04:46:59.500 | 21.74 | -16.11 | 71490.3 | -25.51 | -28.58 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:44:17.010
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : RIO
Location            : Rio de Janeiro
Latitude (deg)      : -22.89506
E. Longitude (deg)  : 316.77708
Altitude (km)       : 0.033
Gaia source ID      : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71131s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 7.417
G magnitude          : 14.588
RP magnitude         : 12.964
BP magnitude         : 18.251
DUPflag             : 0
Distance (au)       : 4.276
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)  : 30.32
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (" ) : 11.419
C/A sky separation (km) : 35409.3
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

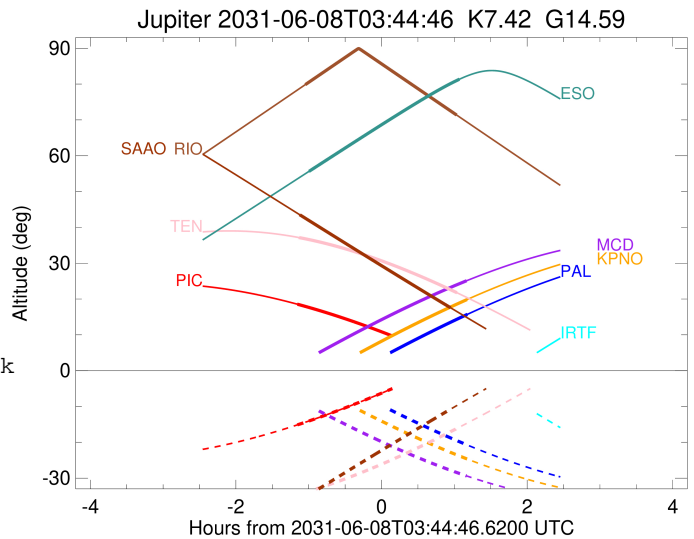
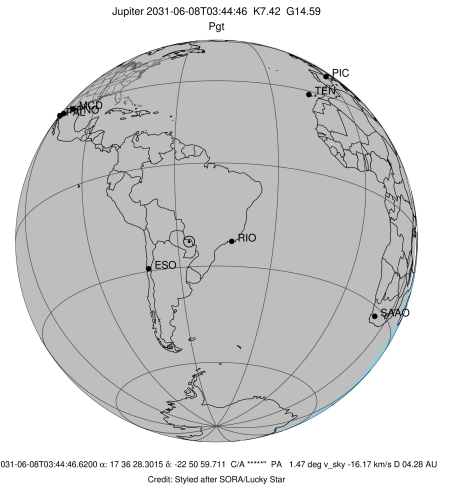


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:41:57.373 | 79.83 | -87.71 | 71489.7 | -29.95 | -33.32 |
| Jupiter | E | 2031-06-08T04:46:37.815 | 71.36 | -63.60 | 71489.7 | -29.52 | -32.86 |

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:47:04.900
Event type           : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code        : ESO
Location             : European Southern Obs. (3.6m)
Latitude (deg)       : -29.26097
E. Longitude (deg)   : 289.26831
Altitude (km)        : 2.400
Gaia source ID       : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71131s
RUWE (>1.4 is poor) : 0.89
K magnitude          : 7.417
G magnitude           : 14.588
RP magnitude         : 12.964
BP magnitude         : 18.251
DUPflag             : 0
Distance (au)        : 4.276
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)   : 30.66
B (ring opening deg) : -2.60
PA of pole (deg)     : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation ("): 11.714
C/A sky separation (km): 36324.1
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

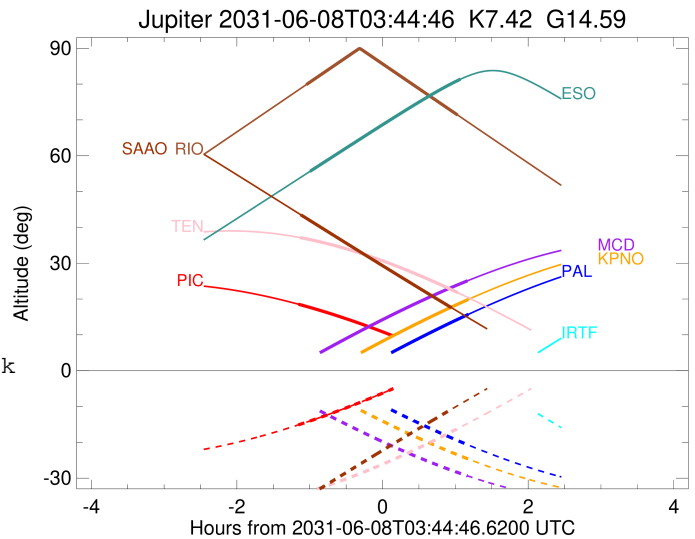
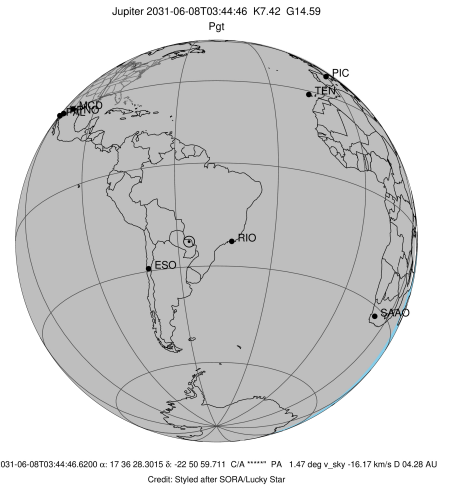


x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:44:59.495 | 55.62 | -63.06 | 71489.5 | -31.03 | -34.46 |
| Jupiter | E | 2031-06-08T04:48:59.937 | 81.35 | -83.53 | 71489.7 | -30.11 | -33.49 |


```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-06-08T03:39:16.000
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : SAAO
Location            : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)      : -32.37953
E. Longitude (deg)  : 20.81070
Altitude (km)       : 1.768
Gaia source ID      : 4116785290664312064
2Mass ID (if available) : 17362831-2250596
ICRS Star Coord at Epoch: 17h 36m 28.30147s -22:50:59.71131s
RUWE (>1.4 is poor) : 0.89
K magnitude         : 7.417
G magnitude         : 14.588
RP magnitude        : 12.964
BP magnitude        : 18.251
DUPflag            : 0
Distance (au)       : 4.276
f0 (km)             : 0.00
g0 (km)             : 0.00
skyplane vel. (km/s) : -16.17
Sun-Target sep (deg) : 172.17
Sun-Moon sep (deg)  : 29.47
B (ring opening deg) : -2.60
PA of pole (deg)    : 1.70
Pole direction: RA (deg): 268.05692
Dec (deg): 64.49651
C/A sky separation (") : 12.137
C/A sky separation (km) : 37638.2
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



x: target alt < 5.0 deg or sun > -5.0 deg

| Target | I/E | UTC | alt | alt-sun | radius | lat-geo | lat-geodetic |
|---------|-----|-------------------------|-------|---------|---------|---------|--------------|
| Jupiter | I | 2031-06-08T02:37:24.538 | 43.52 | -36.28 | 71489.5 | -31.52 | -34.97 |
| Jupiter | E | 2031-06-08T04:41:29.422 | 17.60 | -10.79 | 71489.4 | -32.01 | -35.49 |